LOCATION-BASED SERVICES FOR A MULTI-TECHNOLOGY WIRELESS DEVICE OPERATING IN A FOREIGN TECHNOLOGY MODE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Patent Application No. 60/455,691, filed March 18, 2003, which is entirely incorporated herein by reference.

BACKGROUND OF THE INVENTION

Field of Invention

[0002] This invention relates to location-based services for multi-technology wireless devices. More particularly, the invention relates to a system and method for determining the location of a multi-technology wireless device when that device is operating in a foreign technology mode.

Description of Related Art

[0003] Various wireless technologies have been developed and implemented by wireless telephone carriers within and between different geographic locations around the globe. Examples of such wireless technologies include: Global System for Mobile Communications (GSM), Time Division Multiple Access (TDMA) (also ANSI-136), Code Division Multiple Access (CDMA), Personal Communication Services (PCS), General Packet Radio Service (GPRS), Enhanced Data for GSM Evolution (EDGE), and newer, third generation (3G) mobile systems currently under development. Additional wireless technologies have been developed for other applications such as computer networking (ie. Wi-Fi (IEEE 802.11) and Bluetooth). Each wireless technology type differs in such aspects as protocols, modulation techniques and system/subsystem architecture, thus making the equipment for each technology substantially incompatible with the equipment for the other technologies. Therefore, the various wireless technology types have created an obstacle preventing the wireless customer from being able to travel, or roam, between areas with different technology types, or take advantage of alternative technologies in an area having multiple technology types.

[0004] For these reasons, wireless equipment manufacturers have developed wireless devices capable of operating in multiple technology modes. Additionally, network conversion

elements have been developed in order to enable such cross-technology wireless device operation. These multi-technology wireless devices can operate in both a home technology (native) mode or in one or more alternative technology (foreign) modes. When operating in a foreign mode, the network conversion element translates the signaling for a limited number of functions from the native technology protocol to the foreign technology protocol, consequently enabling the wireless device to access to those limited functions while operating in the foreign mode.

[0005] One example of such multi-technology wireless devices is that of GAIT mobile phones, or terminals, which are named after the standards body (GSM ANSI-136 Interoperability Team) which created the interoperability protocol. GAIT terminals are capable of operation in either GSM technology mode or ANSI-136 (TDMA) technology mode. This multi-technology operation is enabled by a network conversion element known as the Interworking and Interoperability Function (IIF) element, which enables limited mapping of functions between the GSM and ANSI-136 protocols.

[0006] For instance, the IIF element provides emulation of the requisite elements required for intra-technology roaming to the respective inter-technology components in order to provide for inter-technology call delivery. Thus, the IIF element emulates a native mode serving Mobile Switching Center (MSC) to the native mode Home Location Register (HLR), and it emulates a foreign mode HLR to the foreign mode serving MSC.

[0007] Location-based services are personalized services which are based on the location of a wireless device. Using various techniques wireless service providers are able to determine where, geographically, the wireless device is located. Examples of such services include roadside assistance, wireless device tracking, direction services to nearby attractions, traffic information, event information, and even location based targeted advertising, among others. These location-based services for wireless devices are value-added services in the wireless industry.

[0008] For example, in a typical location-based service for a wireless telephone, a location application (such as an application for the services described above) will query a mobile position server (MPS) for the location of a particular wireless telephone. The mobile position server then queries the HLR of the wireless telephone for the identity of the MSC that is serving the wireless telephone. Having the identity of the serving MSC, the mobile position server can then initiate the appropriate location signaling to equipment serving the wireless telephone in

order to determine the location of the wireless phone. There are several positioning technologies that may be used, depending on the level of positioning accuracy needed by the application. The mobile position server then returns the location information for the wireless telephone to the application.

[0009] Therefore, the location-based service for a wireless telephone requires the mobile position server to obtain the identity of the serving MSC in order to initiate the requisite location signaling. However, in the case of a multi-technology wireless telephone that is operating in a foreign technology mode, such as a GAIT mobile phone as described above, the HLR contains only the identity of the network conversion element (which emulates the serving MSC). As a result, the typical location-based service for a wireless telephone is unable to obtain the identity of the actual serving MSC, and, therefore, is unable to initiate the requisite location signaling.

[0010] This problem would be common to any multi-technology wireless device operating in a foreign technology mode where standards and equipment have not been developed for mapping location-based service functionality between the technologies. A potential solution to this problem would be to develop standards and equipment for mapping location-based service functionality between whatever technologies the multi-technology system uses. However, this solution is undesirable because developing standards and equipment for mapping such functions is a lengthy and expensive process, and because the process would have to be repeated for each multi-technology system developed.

[0011] Thus, there is a need for a method of determining the location of a multi-technology wireless device operating in a foreign technology mode, without developing new standards and equipment for each multi-technology system developed.

[0012] There is also a need for a method of determining the identity of equipment serving a multi-technology wireless device operating in a foreign technology mode.

[0013] There is still further a need for a method of formatting an appropriate signaling message to obtain location information for a multi-technology wireless device operating in a foreign technology mode.

[0014] Further, there is a need for a method of identifying the type of technology in which a multi-technology wireless device is operating.

[0015] Even further, there is a need for a system for providing location-based services to a multi-technology wireless devices operating in a foreign technology mode.

[0016] Still further, there is a need for a computer-readable medium having computer-executable instructions for performing a method for determining the location of a multi-technology wireless device operating in a foreign technology mode.

SUMMARY OF THE INVENTION

[0017] The present invention meets these needs, and others, by providing a system and method for determining the location of a multi-technology wireless device, when that device is operating in a foreign technology mode, which substantially utilizes the standards and equipment for inter-technology call delivery and intra-technology location-based services. The invention utilizes an existing network conversion element built to an existing standard to obtain the information needed to perform location services in a cross-technology environment. Accordingly, no new standards or equipment for mapping location-based service functionality between technologies is needed and no time or expense need be spent in developing and implementing such standards and equipment.

[0018] Additionally, the method of the invention determines the identity of the equipment serving a multi-technology wireless device operating in a foreign technology mode, and also provides a way of formatting an appropriate signaling message to obtain such location information for such a multi-technology wireless device operation in a foreign technology mode. As a further benefit, even if location services are not involved, the method of the invention provides a way of identifying the type of technology in which a multi-technology wireless device is operating.

[0019] Generally described, the method of the invention utilizes a mobile position server, or the functional equivalent thereof, to request and receive a temporary dialable number for the multi-technology wireless device operating in a foreign technology mode. The mobile position server then determines the identity of the equipment serving the wireless device by utilizing the temporary dialable number. Once the identity of the serving equipment is known, the mobile position server can initiate appropriate location signaling to the serving equipment in order to determine the location of the wireless device.

[0020] More specifically, in requesting and receiving the temporary dialable number, the mobile position server may request the identity of the serving equipment from a native technology serving equipment subscriber database for the wireless device, which will provide

the identity of a network conversion element in lieu of the identity of the actual serving equipment since the wireless device is operating in a foreign technology mode. Therefore, the mobile position server will be able to determine that the identity returned is that of the network conversion element and request the temporary dialable number for the wireless device from the network conversion element.

[0021] According to an aspect of the invention, a database relating temporary dialable numbers with the identity of the equipment serving those numbers may be available to the mobile position server. Thus, the mobile position server may utilize the temporary dialable number database to cross reference the temporary dialable number with the identity of the equipment serving the temporary dialable number.

[0022] According to another aspect of the invention, in initiating appropriate location signaling to the serving equipment, the mobile position server may determine the level of accuracy desired for the location information and format a request for the location of the wireless device that is appropriate to the desired accuracy and to the equipment that is serving the wireless device. Then, the mobile position server can send the location request directly to the serving equipment.

[0023] Generally described, the method of the invention may also be used to just determine the identity of the equipment serving a multi-technology wireless device operating in a foreign technology mode. The identity of the serving equipment could then be used in determining the location of the wireless device, or for any other purpose that for which the identity of the serving equipment might be useful. According to this aspect of the invention, the mobile position server, or its functional equipment, requests and receives a temporary dialable number for the wireless device. The mobile position server can then utilize a database relating temporary dialable numbers to the equipment serving those numbers, to cross reference the temporary dialable number to the equipment serving that number. In this aspect of the invention, more specifically, the mobile position server may request the identity of the serving equipment from a native technology serving equipment subscriber information database for the wireless device and determine that the subscriber information database has returned the identity of a network conversion element in lieu of the identity of the actual serving equipment. The mobile position server may then request the temporary dialable number from the network conversion element.

[0024] Also generally described, the method of the invention may be simply characterized as a way to initiate appropriate location signaling to equipment serving a multi-technology wireless device operating in a foreign mode, where a mobile position server requests and receives a temporary dialable number for the wireless device, and then determines the identity of the equipment serving the wireless device by utilizing the temporary dialable number. Once the mobile position server determines the identity of the serving equipment, it can format a request for the location of the wireless device appropriate to the identity of the serving equipment and send the request directly to the serving equipment.

[0025] The invention may also be used as a way to identify the type of technology in which a multi-technology wireless device is operating. In this aspect of the invention, generally, a mobile position server, or its functional equivalent, requests and receives a temporary dialable number for the multi-technology wireless device. The mobile position server then utilizes a database which relates temporary dialable numbers with the technology of equipment associated with the temporary dialable numbers to determine the technology of the serving equipment.

[0026] The invention generally includes a database relating temporary dialable numbers with the corresponding equipment serving the temporary dialable numbers, and a mobile position server in communication with the temporary dialable number database. The mobile position server is operative to request and receive a temporary dialable number for the multi-technology wireless device, and then utilize the database to cross reference the temporary dialable number with the identity of the equipment serving that number. Finally, having the identity of the equipment serving the wireless device, the mobile position server is operative to determine the location of the wireless device directly from the serving equipment.

[0027] According to an aspect of the system, the invention may also include a network conversion element that is operative to translate signaling from a native technology protocol to a foreign technology protocol, and a subscriber information database operating in the native technology environment of the wireless device. The subscriber information database would contain the address of the network conversion element associated with the wireless device when it is operating in a foreign technology environment. In this aspect of the invention, the mobile position server is in communication with the network conversion element and the subscriber information database, and the mobile position server is operative to determine that the subscriber information database contains the address of the network conversion element.

Upon making this determination, the mobile position server can request and receive the temporary dialable number from the network conversion element.

[0028] In accordance with other aspects, the invention may also consist of one or more computer readable media having executable instructions for performing the various methods of the invention.

[0029] Additionally, it should be noted that the invention may generally be applied in any wireless environment, including wireless telephones, computers, PDAs and pagers, as well as application in wireless computer networks and any other wireless environments employing multi-technology wireless devices. As such, the term "wireless devices" should be broadly interpreted in conjunction herewith to include any device capable of communicating in any manner with other devices without being connected together by wires, cables, fibers, or the like.

[0030] Other features and advantages of the invention will be described in, or apparent from, the following detailed description of exemplary embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0031] Fig. 1 is a block diagram of selected elements of a system for determining the location of a multi-technology wireless device operating in a foreign technology mode, according to an exemplary embodiment of the invention.

[0032] Fig. 2 is a message flow diagram depicting message generation and propagation steps for an exemplary embodiment of a method for determining the location of a multi-technology wireless device operating in a foreign technology mode.

[0033] Fig. 3 is a message flow diagram depicting message generation and propagation steps for an exemplary embodiment of the invention in which a TDMA native wireless device is operating in a GSM environment, where the wireless device is in an idle mode.

[0034] Fig. 4 is a message flow diagram depicting message generation and propagation steps for an exemplary embodiment of the invention in which a GSM native wireless device is operating in a TDMA environment, where the wireless device is in an idle mode.

[0035] Fig. 5 is a block diagram of selected elements of the system of Fig. 1 also having Location Determining Entity Equipment (LDE) which is capable of more precisely

determining the location of the wireless device by triangulation and other positioning technologies.

[0036] Fig. 6 is a message flow diagram depicting message generation and propagation steps for an exemplary embodiment of the invention in which a TDMA native wireless device is operating in a GSM environment, where the application has requested location information for the wireless device with a higher level of accuracy.

[0037] Fig. 7 is a message flow diagram depicting message generation and propagation steps for an exemplary embodiment of the invention in which a GSM native wireless device is operating in a TDMA environment, where the application has requested location information for the wireless device with a higher level of accuracy.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0038] A system or method in accordance with the present invention may serve various multi-technology wireless devices providing voice, data, video or any other content. Further, the technologies employed may utilize analog, digital or a combination of transmission methods utilizing any number of standards or protocols. Accordingly, the term multi-technology wireless device as used herein means any device that is capable of the wireless communication of any type of information content utilizing any transmission method and more than one standard or protocol.

[0039] The exemplary embodiments contained herein are for multi-technology wireless telephones, or more specifically, GAIT terminals. However, the principles taught herein will apply equally to other multi-technology wireless devices and related network elements. Therefore, unless otherwise noted, all references to wireless telephones, devices, systems and methods are intended to refer generally to all functionally equivalent devices, systems and methods.

[0040] As shown in Fig. 1, an exemplary system **100** for determining the location of a multi-technology wireless device utilizes an apparatus generically referred to herein as a mobile position server (MPS) **110**, which interacts with native technology serving equipment **112**, a network conversion element **114**, foreign technology serving equipment **116**, and various database elements **118**, **120** using a common signaling network **122**.

[0041] The MPS **110** acts as an interface or gateway between a location application **124** and the wireless systems elements. Typically, the location application **124** and the MPS **110** communicate using an internet protocol, such as TCP/IP, and the MPS **110** communicates with the wireless systems elements over a common signaling network **122**, such as Signaling System 7 (SS7). The MPS **110** provides the logic and the signaling capabilities to determine the location of a multi-technology wireless device **126** and deliver the location information to the location application **124**.

[0042] The MPS **110** may be referred to by various titles or names in various protocols. For instance, in the ANSI-136 environment, the MPS is commonly called a Mobile Position Center (MPC); while in the GSM environment it is called a Gateway Mobile Location Center (GMLC).

[0043] The native technology serving equipment (NTSE) **112** provides a database (SUB DB) **128** containing subscriber information which is accessible by the MPS **110** through the common signaling network **122**. The SUB DB **128** typically contains address information for the switching equipment that is actively serving the wireless device. However, in the case of a multi-technology wireless device operating in a foreign technology mode, the network conversion element **114** provides emulation of the serving equipment and the SUB DB **128**, instead, contains address information for the network conversion element **114**.

[0044] In a wireless telephone environment, the subscriber information database **128** is typically referred to as a Home Location Register (HLR).

[0045] The network conversion element (NCE) **114** translates the signaling for a limited number of functions from the native technology protocol to the foreign technology protocol. For basic foreign technology mode operation of a multi-technology wireless device **126**, calls to the device must be rerouted from the native technology serving equipment **112** to the foreign technology serving equipment **116**. The network conversion element **114** provides the signal translation required in order to reroute the call to the foreign technology serving equipment **116**.

[0046] In a GAIT system, the network conversion element **114** is known as the Interworking and Interoperability Function element (IIF).

[0047] The foreign technology serving equipment (FTSE) **116** is the equipment that is actively serving the multi-technology wireless device **126**. As such, the foreign technology serving equipment has active information regarding the physical "cell" in which the device **126** is located from the device signal strength and tower location. Further, the foreign technology serving equipment **116** may also have equipment generically referred to as location determining entity equipment which is capable of more precisely determining the location of the wireless device **126** by triangulation and other positioning technologies.

[0048] The location determining entity equipment (LDE) may be referred to by various titles in various protocols. For instance, in the ANSI-136 environment, the location determining entity equipment is commonly called a Position Determining Entity (PDE); while in the GSM environment it is called a Serving Mobile Location Center (SMLC). The protocols for communication with the location determining entity equipment vary by their technology environment. For this reason, compatible and appropriate location signaling for each technology environment is required for communication with the location determining entity equipment.

[0049] For basic foreign technology mode operation of a multi-technology wireless device **126**, however, the foreign technology serving equipment **116** has temporary dialable numbers which can be temporarily assigned to the device **126** for rerouting calls from the native technology serving equipment **112** to the foreign technology serving equipment **116**.

[0050] In a GAIT system, the temporary dialable numbers are called temporary location directory numbers (TLDNs) in the ANSI-136 environment and roaming numbers in the GSM environment.

[0051] The temporary dialable number database (TDN DB) **118** and the multi-technology subscriber information database (MT SUB DB) **120** are accessible by the MPS **110**.

[0052] The TDN DB **118** is provisioned with information relating temporary dialable numbers to the corresponding equipment serving the temporary dialable numbers.

[0053] The MT SUB DB **120** is provisioned with information relating the subscriber numbers for each of the technologies. For instance, the MT SUB DB **120** for a GAIT system will relate the ANSI-136 Mobile Identification Number (MIN) to the GSM International Mobile Subscriber Identity (IMSI) for use by the mobile position center **110** in communication with the system elements.

[0054] Turning now to Fig. 2, an exemplary method for determining the location of a multi-technology wireless device operating in a foreign technology mode involves: Obtaining a temporary dialable number for the multi-technology wireless device, determining the identity of the equipment serving the wireless device by using the temporary dialable number, and initiating location signaling to the equipment serving the wireless device to determine the location of the wireless device.

[0055] More specifically, as shown in Fig. 2, the MPS **110** receives a request from an application **124** for location information for the wireless device.

[0056] The MPS **110** then obtains the temporary dialable number for the multi-technology wireless device by the following sequence: the MPS **110** requests the identity of the equipment serving the device from the subscriber database (SUB DB) **128** of the native technology serving equipment (NTSE) **112**; the MPS receives a response from the SUB DB **128** and determines that the SUB DB **128** has provided the identity of a network conversion element (NCE) **114** instead of the identity of actual serving equipment; the MPS **110** then request a temporary dialable number (TDN) from the NCE **114**; the NCE **114** requests and receives the TDN from the foreign technology serving equipment (FTSE) **116** using the foreign technology

protocol; and then the NCE **114** returns the temporary dialable number to the MPS **110** in the native technology protocol. Thus, the elements for obtaining the TDN broadly includes the MPS **110,** the SUB DB **128,** the NCE **114**, and the FTSE **116**. The elements for obtaining the TDN are shown as separate elements. However, one will recognize that various equivalent configurations of the elements may be implemented in either hardware or software on one or more computers or other state machines without departing from the spirit or scope of the claimed invention.

[0057] Next, the MPS **110** determines the identity of the equipment serving the wireless device by utilizing the TDN. As discussed earlier, the TDN DB **118** acts to relate temporary dialable numbers for roaming devices in a wireless network with the corresponding equipment serving the temporary dialable numbers. As shown, the MPS **110** uses the temporary dialable number database (TDN DB) **118** to cross reference the TDN with the identity of the FTSE **116**. Therefore, the MPS 110 and the TDN DB 118 work together to determine the identity of the equipment serving the wireless device. Again, the elements for determining the identity of the equipment serving the wireless device are shown as separate elements, but could be implemented either in hardware or software on one or more devices in equivalent configurations.

[0058] Next, having the identity of the FTSE **116**, the MPS **110** determined the location of the wireless device directly from the FTSE **116**. Determining the location of the wireless device involves the MPS **110** formatting a request which provides the desired accuracy and is compatible with the technology and the protocol of the FTSE **116**, sending that request to the FTSE **116**, and receiving the location information from the FTSE **116**.

[0059] Finally, the MPS **110** returns the location information for the wireless device to the application **124**.

[0060] Fig. 3 shows an exemplary embodiment in which an ANSI-136 (TDMA) native GAIT terminal is operating in a GSM environment, where the terminal is in an idle mode. The "Location_Query (MDN)" instruction from the application **324** to the MPS **310** initiates the request for the location of the GAIT terminal having the specified Mobile Directory Number (MDN). Next, the MPS **310** makes a TDMA format request to the HLR **328** for a Short Message (SMSReq) for the phone as a way of requesting the identity of the equipment serving the phone. The HLR **328** responds (SMSReq and Response (MSCID [IIF], MIN)) with the address of the IIF **314** in lieu of the actual Mobile Switching Center ID (MSCID), and the Mobile Identification

Number (MIN) of the phone. Recognizing that the IIF address indicates that the phone is operating in a foreign technology mode, the MPS **310** makes a request for a temporary dialable number by requesting routing information (ROUTREQ (MIN, ESN)) from the IIF **314** using the MIN and the Electronic Serial Number (ESN) of the phone, as if a call had come in to the native technology serving equipment and needed to be rerouted to the foreign technology serving equipment. The IIF **314** translates the request into a GSM protocol request to Provide Routing Number (PRN (IMSI, MSISDN, MSC No.)) to the foreign technology serving equipment (GSM MSC) **316**, which responds with a temporary dialable number (PRN Ack (Roaming Number)). The IIF **314** then returns the temporary dialable number to the MPS **310** in ANSI-136 protocol (routreq (MSCID, TLDN)) as a Temporary Location Directory Number (TLDN). The MPS **310** is then able to cross-reference the temporary dialable number with the identity of the GSM MSC **316** by accessing the temporary dialable number database (not shown). With the identity of the GSM MSC **316**, the MPS **310** can then request location information for the phone directly from the GSM MSC **316** with a Provide Subscriber Information (PSI (IMSI, location info, sub state req)) request in GSM protocol. The GSM MSC **316** then returns the desired location information with a Provide Subscriber Information Acknowledgment (PSI Ack (location info, MSC Number, sub state resp) in GSM protocol. Lastly, the MPS **310** returns the location information to the application **324** with Location_Query_Response in an IT protocol, or the like.

[0061] Fig. 4 shows an exemplary embodiment in which a GSM native GAIT terminal is operating in an ANSI-136 environment, where the terminal is in an idle mode. The "Location_Query (MSISDN)" instruction from the application **424** to the MPS **410** initiates the request for the location of the GAIT terminal having the specified Mobile Station ISDN (MSISDN) number. Next, the MPS **410** makes a GSM format request to the HLR **428** for a Short Message (SRI_for_SM (MSISDN)) for the phone as a way of requesting the identity of the equipment serving the phone. The HLR **428** responds (SRI_for_SM_Ack (IMSI, MSC Number (IIF Address)) with the address of the IIF **414** in lieu of the actual Mobile Switching Center Number (MSC Number), and the IMSI of the phone. Recognizing that the IIF address indicates that the phone is operating in a foreign technology mode, the MPS **410** makes a request for a temporary dialable number by requesting Provide Routing Number (PRN (IMSI, MSISDN, MSC No.)) from the IIF **414** using the IMSI and the MSISDN of the phone, as if a call had come in to the native technology serving equipment and needed to be rerouted to the foreign technology serving equipment. The IIF **414** translates the request into a ANSI-136 protocol Route Request

(ROUTREQ(MIN, ESN)) to the foreign technology serving equipment (TDMA MSC) **416**, which responds with a temporary dialable number (routreq(MSCID, TLDN)). The IIF **414** then returns the temporary dialable number to the MPS **410** in GSM protocol (PRN Ack (Roaming Number)) as a Roaming Number. The MPS **410** is then able to cross-reference the temporary dialable number with the identity of the TDMA MSC **416** by accessing the temporary dialable number database (not shown). Having the identity of the TDMA MSC **416**, the MPS **410** can then request location information for the phone directly from the TDMA MSC **416** with an IS Position Request (ISPOSREQ(MIN)) request in ANSI-136 protocol. The TDMA MSC **416** then returns the desired location information with a IS Position Request acknowledgment (isposreq(mob_info, SCellID) in ANSI-136 protocol. Lastly, the MPS **410** returns the location information to the application **424** with Location_Query_Response in an IT protocol, or the like.

[0062] Fig. 5 shows an exemplary embodiment of the foreign technology serving equipment **116** of Fig. 1 also having location determining entity equipment (LDE) **530** which is capable of more precisely determining the location of the wireless device **126** by triangulation and other positioning technologies. Generally, the foreign technology serving equipment **116** consists of a Mobile Switching Center (MSC) **532** which may serve a number of Base Station Controllers (BSCs) **534**. The MSC **532** and the LDE **530** are both connected to the common signaling network **122**, but may also be connected directly to each other.

[0063] Fig. 6 shows an exemplary embodiment in which an ANSI-136 (TDMA) native GAIT terminal is operating in a GSM environment, where a higher level of accuracy has been requested by the application **624**. The message flow proceeds as described in the embodiment of Fig. 3, with the exception that the MPS **610** formats an appropriate location request that utilizes the LDE **630** directly through the common signaling network **122**. The LDE **630** then returns location information for the mobile phone with the desired level of accuracy.

[0064] Fig. 7 shows an exemplary embodiment in which GSM native GAIT terminal is operating in a TDMA environment, where a higher level of accuracy has been requested by the application **724**. The message flow proceeds as described in the embodiment of Fig. 4, with the exception that the MPS **710** formats an appropriate location request that utilizes the LDE **730** directly through the common signaling network **122**. The LDE **730** then returns the location information for the mobile phone with the desired level of accuracy

[0065] It should be noted that the principles described for the GAIT terminals and systems would also apply to other multi-technology systems, such as a GSM to CDMA type multi-technology system.

[0066] Thus, the invention provides a system and method for determining the location of a multi-technology wireless device operating in a foreign technology mode, among other benefits and features.

[0067] One of skill in the art will recognize that additional configurations are possible without departing from the teachings of the invention or the scope of the claims which follow.

[0068] This detailed description, and particularly the specific details of the exemplary embodiments disclosed, is given primarily for clearness of understanding and no unnecessary limitations are to be understood therefrom, for modifications will become obvious to those skilled in the art upon reading this disclosure and may be made without departing from the spirit or scope of the claimed invention.